What is claimed is:

1. A method for enhancing survival of neural cells at risk of dying, the method comprising providing a morphogen to said cells at a concentration and for a time sufficient to enhance survival of said cells.

2. The method of claim 1 wherein said cells are at risk of dying due to chemical or mechanical trauma to nerve tissue comprising said cells.

3. The method of claim 2 wherein said trauma comprises a transected nerve.

4. The method of claim 2 wherein said morphogen is provided to said cells prior to said trauma.

5. The method of claim 2 wherein said trauma results in demyelination of said cells.

6. The method of claim 2 wherein said trauma results from exposure of said cells to a cellular toxin.

7. The method of claim 6 wherein said toxin comprises ethanol.

8. The method of claim 1 wherein said cells are at risk of dying due to a neuropathy.

9. The method of claim 8 wherein the etiology of said neuropathy is metabolic, infectious, toxic, autoimmune, nutritional, or ischemic.

10. The method of claim 9 wherein said neuropathy comprises Parkinson's disease, Huntington's chorea, amyotrophic lateral sclerosis, multiple sclerosis or Alzheimer's disease.

11. The method of claim 1 wherein said cells are at risk of dying due a neoplastic lesion associated with nerve tissue comprising said cells.

12. The method of claim 11 wherein said lesion results from a neoplasm comprising cells of neuronal origin.

13. The method of claim 12 wherein said neoplasm comprises a neuroblastoma or a retinoblastoma.

14. The method of claim 11 wherein said lesion results from a neoplasm comprising glial cells.

15. The method of claim 1 wherein said neural cells at risk of dying comprise part of the central nervous system.

16. The method of claim 15 wherein said cells comprise striatal basal ganglia neurons.

17. The method of claim 15 wherein said cells comprise neurons of the substantia nigra.

18. The method of claim 1 wherein said cells at risk of dying comprise part of the peripheral nervous system.

19. The method of claim 1 wherein said morphogen stimulates cell adhesion molecule production in said cells.

20. The method of claim 19 wherein said cell adhesion molecule is a nerve cell adhesion molecule.

21. The method of claim 20 wherein nerve cell adhesion molecule is selected from the group consisting of N-CAM-120, N-CAM-140 and N-CAM-180.

22. The method of claim 1 wherein said morphogen comprises an amino acid sequence sharing at least 70% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx) and 60A(fx).

23. The method of claim 22 wherein said morphogen comprises an amino acid sequence sharing at least 80% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx), and 60A (fx).

24. The method of claim 23 wherein said morphogen comprises an amino acid sequence having greater than 60% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

25. The method of claim 24 wherein said morphogen comprises an amino acid sequence having greater than 65% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

26. The method of claim 21 wherein said morphogen comprises an amino acid sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1), including allelic and species variants thereof.

27. A method for enhancing the survival of neural cells at risk of dying in a mammal, the method comprising the step of administering to said mammal an effective amount of an agent capable of stimulating production of an endogenous morphogen.

28. The method of claim 27 wherein said agent stimulates production of an endogenous morphogen in the tissue comprising said neural cells.

29. A method for maintaining a neural pathway in a mammal, comprising:

providing a morphogen to the neurons defining said pathway at a concentration and for a time sufficient to maintain said pathway.

30. The method of claim 29 wherein said morphogen is provided prior to injury to said pathway.

31. The method of claim 29 wherein said morphogen is sufficient to stimulate repair of a damaged neural pathway.

32. The method of claim 31 wherein said damaged neural pathway results from mechanical or chemical trauma to said pathway.

33. The method of claim 32 wherein said trauma comprises a severed nerve.

34. The method of claim 32 wherein said trauma comprises demyelination of the neurons defining said pathway.

35. The method of claim 32 wherein said trauma results from exposure of the cells defining said pathway to a cellular toxin.

36. The method of claim 35 wherein said toxin comprises ethanol.

37. The method of claim 29 wherein said damaged neural pathway results from a neuropathy of the cells defining said pathway.

38. The method of claim 37 wherein the etiology of said neuropathy is metabolic, infectious, toxic, autoimmune, nutritional, or ischemic.

39. The method of claim 38 wherein said neuropathy comprises Parkinson's disease, Huntington's chorea, amyotrophic lateral sclerosis, multiple sclerosis, or Alzheimer's disease.

40. The method of claim 37 wherein said neuropathy comprises axonal degeneration.

41. The method of claim 37 wherein said neuropathy comprises a demyelinating neuropathy.

42. The method of claim 29 wherein said damaged neural pathway results from a neoplastic lesion.

43. The method of claim 42 wherein said neoplastic lesion is caused by a neuroblastoma or a glioma.

44. The method of claim 29 wherein said morphogen stimulates cell adhesion molecule production in a cell defining said pathway.

45. The method of claim 44 wherein said cell adhesion molecule is a nerve cell adhesion molecule.

46. The method of claim 45 wherein nerve cell adhesion molecule is selected from the group consisting of N-CAM-120, N-CAM-140 and N-CAM-180.

47. The method of claim 29 or 46 wherein said morphogen comprises an amino acid sequence sharing at least 70% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx) and 60A(fx).

48. The method of claim 47 wherein said morphogen comprises an amino acid sequence sharing at least 80% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx), and 60A (fx).

49. The method of claim 48 wherein said morphogen comprises an amino acid sequence having greater than 60% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

50. The method of claim 49 wherein said morphogen comprises an amino acid sequence having greater than 65% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

51. The method of claim 50 wherein said morphogen comprises an amino acid sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1), including allelic and species variants thereof.

52. A method of maintaining a neural pathway in a mammal comprising:

administering said mammal an effective amount of an agent capable of stimulating production of an endogenons morphogen in a cell defining said pathway.

53. A composition for promoting regeneration of a neural pathway at a site of injury in a mammal, comprising:

a biocompatible, in vivo bioresorbable carrier suitable for maintaining a protein at a site in vivo, and

a morphogen, such that said morphogen, when dispersed in said carrier and provided to said site of injury, is capable of stimulating neural pathway regeneration at said site.

54. The composition of claim 53 wherein said carrier is structurally sufficient to assist direction of axonal growth.

55. The composition of claim 54 wherein said carrier comprises a polymeric material.

56. The composition of claim 54 wherein said carrier comprises laminin or collagen.

57. A device for repairing a break in a neural pathway, the device comprising:

    a biocompatible tubular casing comprising an exterior and an interior surface and defining a channel through which a neural process may regenerate,

    said device having a shape and dimension sufficient to span a break in a neural pathway, and having openings adapted to receive the ends of a severed nerve, and

    a morphogen disposed within the channel defined by said tubular casing and accessible to severed nerve ends defining a break in a neural pathway, such that said morphogen stimulates neural pathway regeneration when disposed in said channel and accessible to said nerve ends.

58. The device of claim 57 wherein said morphogen is disposed in said channel together with a biocompatible, bioresorbable carrier suitable for maintaining a protein at a site _in vivo_.

59. The device of claim 58 wherein said carrier comprises sufficient structure to assist direction of axonal growth within said channel.

60. The device of claim 57 wherein the outer surface of said casing is substantially impermeable.

61. The device of claim 58 wherein said carrier comprises a polymer.

62. The device of claim 58 wherein said carrier comprises laminin or collagen.

63. A method for inducing the redifferentiation of transformed cells of neural origin, the method comprising the step of:

contacting said transformed cells with a morphogen composition at a concentration and for a time sufficient to induce redifferentiation of said cells to a morphology characteristic of untransformed neuronal cells.

64. The method of claim 63 wherein said morphology characteristic of untransformed nerve cells includes formation of neurite outgrowths.

65. The method of claim 63 wherein said morphology characteristic of untransformed nerve cells includes cell aggregation and cell adhesion.

66. The method of claim 63 wherein said morphogen composition induces nerve cell adhesion molecule production in said cells.

67. The method of claim 63 wherein said induced nerve cell adhesion molecules include N-CAM-180, N-CAM-140 and N-CAM-120.

68. The method of claim 63 wherein said transformed cells comprise neuroblastoma cells.

69. A method for detecting a neuropathy in a mammal, the method comprising the step of:

detecting fluctuations in the physiological concentration of a morphogen present in the serum or cerebrospinal fluid of said mammal, said fluctuations being indicative of an increase in neuronal cell death.

70. A method for detecting a neuropathy in a mammal, the method comprising the step of:
detecting fluctuations in the physiological concentration of a morphogen antibody titer present in the serum or cerebraospinal fluid of said mammal, said fluctuations being indicative of an increase in neuronal cell death.

71. The method of claim 69 or 70 wherein said neuropathy results from a neurodegenerative disease, nerve demyelineation, myelin dysfunction, neuronal neoplasias, or nerve trauma.

72. A method of stimulating production of cell adhesion molecules in a tissue comprising the step of:
providing a morphogen to said tissue for a time and at a concentration sufficient to induce production of cell adhesion molecules in cells of said tissue.

73. The method of claim 72 wherein said cell adhesion molecules comprises nerve cell adhesion molecules.

74. The method of claim 73 wherein said cells comprise neurons.

75. The method of claim 69, 70 or 72 wherein said morphogen comprises an amino acid sequence sharing at least 70% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx) and 60A(fx).

76. The method of claim 75 wherein said morphogen comprises an amino acid sequence sharing at least 80% homology with one of the sequences selected from the group consisting of: OP-1, OP-2, CBMP2, Vgl(fx), Vgr(fx), DPP(fx), GDF-1(fx) and 60A (fx).

77. The method of claim 76 wherein said morphogen comprises an amino acid sequence having greater than 60% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

78. The method of claim 77 wherein said morphogen comprises an amino acid sequence having greater than 65% amino acid identity with the sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1.)

79. The method of claim 78 wherein said morphogen comprises an amino acid sequence defined by residues 43-139 of Seq. ID No. 5 (hOP1), including allelic and species variants thereof.

80. A composition for enhancing survival of neuronal cells at risk of dying comprising a morphogen in association with a molecule capable of enhancing the transport of said morphogen across the blood-brain barrier.

81. The invention of claim 53 or 57 wherein said carrier comprises brain tissue derived extracellular matrix.

Add B1

Add B1

Add B5